WHAT IS CLAIMED IS:

1. A cathode active material for a non-aqueous electrolyte secondary cell, having a c-axis length of lattice constant of 14.080 to 14.160 Å, an average particle size of 0.1 to 5.0 μm, and a composition represented by the formula:

$$LiCo_{(1-x-y)}Mn_xMg_yO_2$$

wherein x is a number of 0.008 to 0.18; and y is a number of 0 to 0.18.

2. A cathode active material according to claim 1, which has an a-axis length of lattice constant of 2.81 to 2.83 Å.

3. A cathode active material according to claim 1, which has a BET specific surface area of 0.1 to 2.5 m^2/g and a crystallite size of 400 to 1,200 Å.

4. A cathode active material according to claim 1, wherein the manganese content y is 0.01 to 0.15.

5. A process for producing the cathode active material for a non-aqueous electrolyte secondary cell, comprising:

adding an aqueous alkali solution to a solution

containing a cobalt salt and a manganese salt with or without a magnesium salt to conduct a neutralization reaction therebetween;

oxidizing a resultant mixed solution by passing an oxygen-containing gas therethrough to obtain a cobalt oxide containing manganese or both manganese and magnesium;

mixing the cobalt oxide with a lithium compound; and

heat-treating a resultant mixture of the cobalt oxide and the lithium compound.

6. A process according to claim 5, wherein the manganese salt is added in an amount of 0.1 to 20 mol%, calculated as manganese, based on cobalt; the magnesium salt is added in an amount of not more than 20 mol%, calculated as magnesium, based on cobalt; the equivalent ratio of alkali contained in the aqueous alkali solution added for the neutralization reaction to a neutralized component of the whole metal salts is 1.0 to 1.2; the oxidation reaction temperature is not less than 30℃; the mixing molar ratio of lithium to a sum of cobalt and manganese is 0.95 to 1.05; and the heat-treating temperature is 600 to 950℃.

7. A cathode active material for a non-aqueous electrolyte secondary cell produced by the process as defined in claim 5, having a c-axis length of lattice

constant of 14.080 to 14.160 Å, an average particle size of 0.1 to 5.0 μm, and a composition represented by the formula:

$$LiCo_{(1-x-y)}Mn_xMg_yO_2$$

wherein x is a number of 0.008 to 0.18; and y is a number of 0 to 0.18.

8. A cathode active material for a non-aqueous electrolyte secondary cell, having a c-axis length of lattice constant of 14.080 to 14.160 Å, an a-axis length of lattice constant of 2.81 to 2.83 Å, a crystallite size of 400 to 1,200 Å, an average particle size of 0.1 to 5.0 μm, and a composition represented by the formula:

$$LiCo_{(1-x-y)}Mn_xMg_yO_2$$

wherein x is a number of 0.008 to 0.18; and y is a number of 0 to 0.18.

9. A cathode active material for a non-aqueous electrolyte secondary cell, having a c-axis length of lattice constant of 14.080 to 14.160 Å, an a-axis length of lattice constant of 2.81 to 2.83 Å, a crystallite size of 400 to 1,200 Å, an average particle size of 0.1 to 5.0 μm, and a composition represented by the formula:

$$LiCo_{(1-x-y)}Mn_xMg_yO_2$$

wherein x is a number of 0.008 to 0.18; and y is a number of 0.010 to 0.15.

10. A non-aqueous electrolyte secondary cell comprising a lithium ion conductive electrolyte and a pair of electrodes separated by means of a separator, wherein at least one of said electrodes comprises a cathode active material having a c-axis length of lattice constant of 14.080 to 14.160 Å, an average particle size of 0.1 to 5.0 μm, and a composition represented by the formula:

$$LiCo_{(1-x-y)}Mn_xMg_yO_2$$

wherein x is a number of 0.008 to 0.18; and y is a number of 0 to 0.18.